In the Claims

1. (Currently Amended) A process for obtaining an object image of at least one object comprising:

illuminating the object with illumination light from an illumination light source,

providing at least two different object conditions on the object, said object conditions comprising light intensity of said illumination light or a physical or chemical condition at a location of the object influencing at least one characteristic of light from the object and said object conditions being ~~subsequently~~ formed on the object with at least one spatial pattern, wherein said light from ~~each~~ an object point of the object having a non-linear dependency upon at least one of the object conditions or a multi-linear dependency upon at least two of the object conditions provided at the object point,

capturing at least two partial images of the object corresponding to the formation of said object conditions, wherein the partial images contain different contributions of various spatial frequency components of the object structure, and

determining a desired object image by computational reconstruction of the spatial frequency components.

2. (Previously Presented) The process according to claim 1, wherein spatial patterns of at least one object condition are formed, for each of which the non-linear dependence of the detected light emitted from the object point exists.

3. (Previously Presented) The process according to claim 1, wherein spatial patterns are formed by at least two object conditions, for which a dependence of the detected light on a multiplicative linking of the object conditions and a linear or a non-linear dependence of the detected light on each of the object conditions exists.

4. (Previously Presented) The process according to claim 1, 2 or 3, wherein the spatial pattern is given by a pattern of an illumination intensity on the object and the object is illuminated with the pattern of the illumination intensity in such a way that a non-linear dependence of the light intensity, detected at a detector device, coming out from the object points to the illumination intensity obtained at this object point exists.

5. (Previously Presented) The process according to claim 1, 2 or 3, wherein the non-linear dependence of the detected light is formed by a saturation of fluorescence light of fluorophores under intensive illumination, a saturation of the absorption of illumination light under intensive illumination, a dependence of the phase of the emitted or scattered light on the illumination intensity present in the object, SHG or THG processes, a dependence of the light characteristics of the Raman scattering on the value of one or more object characteristics, time coherent effects on atoms or molecules in the object, multiphoton absorption, CARS processes, stimulated emission, population of longer-liver states or chemically altered states, radiative or radiation-free energy transfer processes of fluorophores to neighboring fluorophores, nonhomogeneous electric or magnetic fields obtaining at the object point, pressures, shear forces, or mechanical tension relationships obtaining at the object point, temperatures obtaining at the object point, chemical relationships obtaining at the object point, and/or additional object irradiations with electromagnetic rays or sound waves.

6. (Previously Presented) The process according to claim 1, 2 or 3, wherein the spatial pattern of an object condition in reciprocal space can be described or approximately described by a number of points which are distributed in one, two, or three dimensions, or is formed spatially periodically or approximately periodically in one or more dimensions in the location space.

7. (Previously Presented) The process according to claim 1, 2 or 3, wherein the object and the spatial pattern are displaced in one or more directions relative to one another to achieve

various object conditions.

8. (Previously Presented) The process according to claim 7, wherein the pattern is generated by a mask or by interference and a displacement of a mask is achieved by displacement of the phase of various diffraction maxima.

9. (Previously Presented) The process according to claim 1, 2 or 3, wherein the object conditions are changed according to a predetermined temporal structure and the partial images are taken at various times.

10. (Previously Presented) The process according to claim 9, wherein illumination intensity is varied to generate different object conditions.

11. (Previously Presented) The process according to claim 1, 2 or 3, wherein the reconstruction of the object image from the partial images is performed by solving an equation system, taking into account the non-linear dependencies, or by an iterative procedure.

12. (Previously Presented) The process according to claim 1, 2 or 3, wherein the position of the object or one or more partial objects of the object is established.

13. (Previously Presented) The process according to claim 1, 2 or 3, wherein the reconstruction of the object image is performed by consideration of a previously known structure of the object or of parts of the object.

14. (Currently Amended) An topical imaging system comprising:

an illumination device and a detector device arranged for illuminating an object and recording an image of the object or of parts of the object,

at least one pattern generator arranged for generating at least two different object conditions on the object, said object conditions comprising light intensity of said illumination light or a physical or chemical condition at a location of the object influencing at least one characteristic of light from

the object and said at least one pattern generator being arranged for ~~subsequently~~ forming said object conditions on the object with at least one spatial pattern, with the illumination device and/or the pattern generator being arranged for generating said object conditions such that light from ~~each~~ an object point of the object having a non-linear dependency upon at least one of the object conditions or a multi-linear dependency upon at least two of the object conditions provided at the object point, and

an image generator arranged for computational reconstruction of an object image from partial images which were recorded with the detector device.

15. (Previously Presented) The optical system according to claim 14, wherein the pattern generator comprises a mask with which a spatial pattern of an illumination intensity can be formed on the object.

16. (Previously Presented) The optical system according to claim 15, wherein the mask comprises a multidimensional diffraction grating, a phase grating, a DMD device, or an LCD matrix.

17. (Previously Presented) The device according to claim 15 or 16, wherein the mask and a sample are positioned so they are movable and/or rotatable relative to one another.

18. (Previously Presented) The optical system according to claim 14, wherein the pattern generator comprises a mirror assembly arranged for generating an interference pattern on the object.

19. (Previously Amended) The optical system according to claim 14, wherein the pattern generator comprises a device for achieving predetermined physical or chemical conditions on the object corresponding to the spatial pattern.

20. (Previously Presented) The optical system according to claim 14, wherein an adjustment device for displacement of the object in the spatial pattern of the object conditions is provided.

21. (Previously Presented) The optical system according to claim 14, 15, 16, 19 or 20, wherein the illumination device comprises a flash lamp, a laser, or a high-pressure lamp.

22. (Currently Amended) The optical system according to claim 14, 15, 16, 19 or 20, wherein ~~an~~ illumination optics and/or an imaging optic are provided.

23. (Previously Presented) Usage of a process or an optical system according to claim 14 in combination with typical optical microscopy processes, particularly in combination with standard far field microscopy, epifluorescence microscopy, confocal microscopy, 4Pi microscopy, theta microscopy, near field microscopy, microscopic I^2M, I^3M, and I^5M processes, STED processes, multiphoton microscopy, CARS processes, and SHG or THG microscopy.

24. (Previously Presented) The process according to claim 1, wherein reconstructing the desired object image involves computational separation of spatial frequency components.

25. (Previously Presented) An optical imaging system according to claim 14, wherein the image generator is arranged for computational separation of spatial frequency components.